



R20 Regulation

Subject code: 3B2AE

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A' Grade)

B.Tech II Semester Supplementary Examinations, September 2023

Ordinary Differential Equations, Transforms & Vector Calculus
(EEE)

Maximum Marks: 70

Date:14.09.2023 Duration: 3 hours

- Note: 1. This question paper contains two parts A and B.
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks

(10x2M=20 Marks)

- 1 Define Linear differential equation.
- 2 Find I. F. of $2xydy - (x^2 + y^2 + 1)dx = 0$.
- 3 Find the C.F. of $(D^2 + 9)y = \cos 3x$.
- 4 Find General solution of $(D^3 + 2D^2 + D)y = 0$.
- 5 Find $L(t + \sin 2t)$.
- 6 State second shifting theorem.
- 7 Define divergence of a vector point function.
- 8 Find a unit normal vector to the given surface $x^2y + 2xz = 4$ at the point (2,-2,3).
- 9 State stoke's theorem.
- 10 State Greens theorem in a plane.

Part-B

Answer All the following questions.

(5X10M=50Marks)

- 11 Solve $x \frac{dy}{dx} + y = x^3y^6$ [10]
- 12 Solve $y(1 + xy)dx + x(1 - xy)dy = 0$ [10]
- 13 Solve $(D^3 + 2D^2 + D)y = e^{2x} + \sin 2x$ [10]

OR

14 Solve $(D^2 + 2D - 3)y = x^2e^{-3x}$ [10]

OR

15 Find $L\{t e^{-t} \cos 2t\}$. [10]

OR

16 Find $L^{-1}\left[\frac{s^2}{(s^2+a^2)(s^2+b^2)}\right]$ using convolution theorem. [10]

17 Prove that $\vec{f} = (y^2 \cos x + z^3)\vec{i} + (2y \sin x - 4)\vec{j} + (3xz^2)\vec{k}$ is irrotational. [10]

OR

18 Find the angle between the surface $xy^2z = 3x + z^2$ and $3x^2 - y^2 + 2z = 1$ at $(1, -2, 1)$ [10]

19 Use Greens theorem for $\int_c (3x^2 - 8y^2)dx + (4y - 6xy) dy$ where 'c' is the region bounded by $x=0, y=0,$ and $x+y=1$. [10]

OR

20 Verify Green's Theorem for $\int_c [(xy + y^2) dx + x^2 dy]$, where c is bounded by $y = x$ and $y = x^2$ [10]